

## Authentication of Physical and Electronic Media Objects Using Digital Watermarks

### *Abstract of the Disclosure*

Digital watermark methods for encoding auxiliary data into a host signal are used  
5 to authenticate physical and electronic objects. One such method computes a content  
specific message dependent on the host signal, encodes the content specific message into  
a watermark signal, and embeds the watermark in the host signal such that the watermark  
signal is substantially imperceptible in the host signal. One specific implementation  
embeds data representing salient features of the host signal into the watermark. For  
10 example, for photo IDs, the method embeds the spatial location of salient features of the  
photo into the watermark. Another implementation computes a semi-sensitive hash of  
the host signal, such as a low pass filtering of the signal, and embeds the hash into the  
watermark. The watermark signal may be content dependent by making the watermark  
key dependent on some attribute of the signal in which the watermark is embedded.  
15 Another approach is to make the watermark key dependent on a user or an attribute of the  
user. Yet another approach is to use multiple watermark components and multiple  
watermark detection stages that help identify and screen out invalid watermark signals.  
Another digital watermarking method for authenticating a media object transforms a  
media signal to a frequency domain comprising an array of frequency coefficients. It  
20 selects a first set of frequency coefficients, and alters the selected first set of frequency  
coefficients so that values of the coefficients in the set correspond to a pattern. The  
pattern of the media signal is authenticated by comparing a pattern of the values of the  
frequency coefficients in the set with an expected pattern.